THE INDIAN BOILERS ACT, 1923 (V OF 1923).

G. N., G. D., No. 4667-II, dated 15th December 1924 (B. G., 1925, Pt. I, p. 148).

S. 29 Bombay Boiler Rules, 1924.

Amended by G. N., G. D., No. 4667, dated 12th July 1926.
Amended by G. N., G. D., No. 4667, dated 27th May 1927.
Amended by G. N., G. D., No. 1325, dated 26th August 1929.
Amended by G. N., P. D., No. 7213, dated 26th August 1930.
Amended by G. N., P. D., No. 7213, dated 9th September 1930.
Amended by G. N., P. D., No. 7933, dated 15th August 1931.
Amended by G. N., P. D., No. 8024, dated 6th October 1931.
Amended by G. N., P. D., No. 7213, dated 1st December 1931.
Amended by G. N., P. D., No. 8024, dated 19th March 1932.
Amended by G. N., P. & R. D., No. 7213, dated 18th May 1933.
Amended by G. N., P. & R. D., No. 9699-I, dated 1st June 1933.
Amended by G. N., P. & R. D., No. 9699, dated 10th November 1933.
Amended by G. N., P. & R. D., No. 7213, dated 9th January 1935.
Amended by G. N., P. & R. D., No. 7213, dated 5th January 1937.
Amended by G. N., P. & S. D., No. 7715, dated 14th May 1938.
Amended by G. N., P. & S. D., No. 7715, dated 10th March 1941.
Amended by G. N., P. & S. D., No. 7213, dated 23rd June 1941.
Amended by G. N., G. D., No. 489/46, dated 16th April 1949.
Amended by G. N., P. & S. D., No. 7715, dated 22nd September 1942.
Amended by G. N., P. & S. D., No. 6310/33, dated 14th January 1943.
Amended by G. N., Lab. Dept., No. 489/46, dated 26th November 1949.
Amended by G. N., Lab. Dept., No. 24/48, dated 20th November 1949.
Amended by G. N., Lab. & H. D., No. 550/48, dated 11th April 1951.
Amended by G. N., Lab. & H. D., No. 489/46, dated 16th June 1951.
Amended by G. N. Lab. & H. D. No. 1606/48 dated 20th March 1952.

In exercise of the powers conferred by section 29 of the Indian Boilers Act, 1923 (Act No. V of 1923), and in supersession of all previous rules under the Bombay Boiler-inspection Act, 1891, as amended by Bombay Boiler Inspection (Amendment) Act, 1923 (Bom. Act No. VII of 1923), the Governor in Council is pleased to make the following rules, namely :—

THE BOMBAY BOILER RULES, 1924.

I—Preliminary.

1. Division into parts.
2. Definitions.
3. Payment of fees.
4. Location of offices.

Part I.

BOILER INSPECTION ADMINISTRATIVE RULES.

II—Duties of the Chief Inspector.

5. Administrative control.
6. Duty of general control.
7. Specific duties.
8. Instruction to owners.
9. Registers to be kept.
10. Control of bills.

III—Duties of Inspector.

11. Subordinate to Chief Inspector.
12. General duties of Inspectors.
13. Inspector to see that boilers are worked according to law.
14. Inspectors to advise owners.
15. Specific duties.
16. Inspections at special times.
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19. Importance of registration.
20. Receipt of applications.
21. Necessity of avoiding delay.
22. Register of registered boilers.
23. Procedure on transfer of a boiler.
24. Entry of transferred boiler in register.
25. Note of transferred and dismantled boilers.

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26. Procedure at inspections; internal inspection.
27. External inspection.
28. Casual working inspections.
29. Proposals for reduction of pressure.
30. Repairs to boilers.
31. Entries in Memorandum of Inspection Books.
32. Entries in certificates.
33. Engraving of registry number.
34. Arranging for inspection.
35. Issue of certificates and provisional orders.
36. Provisional orders to be issued after hydraulic test.
37. Forms of provisional orders and certificates.
38. Duplicate certificates.
39. Fees for inspection.
40. Fee to cover inspection and tests.
41. Second fee in default.
42. Sanction of Chief Inspector to second fee.
43. Special fee for inspections out of season.
44. Fee for copy of Registration Book.
45. Duplicate certificate fees.
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Appendix to Part I.

Form A.—Register of Boilers.
Form B.—Notice of examination of boilers under sections 7 and 8 of the Act.
Form C.—General working of boilers. Instructions to boiler attendants.

Appendix to Parts II and III.

Form I.—Application for an engineer's certificate of proficiency or for a boiler attendant's certificate of competency.
Form II, Form III } Certificates of competency to be granted under Rule 120.
Form IV.—Certificate of service to be granted under Rule 120.
Form V.—Certificate of proficiency to be granted under Rule 160.

THE BOMBAY BOILER RULES, 1924.

I—Preliminary.

1. *Division into parts.*—These rules are divided into three parts as follows, namely:—

PART I.—Boiler Inspection Administrative Rules;
PART II.—Boiler Attendants' Rules; and
PART III.—Engineers' Examination Rules.

All the three Parts, with the exception of section IX of Part II, shall come into force from the date of this notification. Section IX of Part II shall come into force from the 1st July 1925.

2. *Definitions.*—In these rules unless there is anything repugnant in the subject or context,—

(*a*) "the Act" means the Indian Boilers Act, 1923;

(*b*) "Section" means a section of the said Act;

(*c*) "Regulation" means a regulation framed by the Board under section 28 of the said Act;

(*d*) "Rule" means a rule framed by the Government of Bombay under section 29 of the said Act;

(*e*) "Commissioner" means the Commissioner of Labour, Bombay, or any deputy appointed by him under any rule allowing the appointment of a deputy.

3. *Payment of fees.*—All fees payable under the Act shall be deposited by the payer in a Government Treasury or the Reserve Bank of India in the State of Bombay.

Applications under sections 7 and 8 of the Act to which the treasury or bank receipt is affixed shall be deemed to be accompanied by the prescribed fee.

All fees, costs and penalties levied under the Act shall be disposed of in such manner as the State Government shall from time to time direct.

4. *Location of offices.*—The location and charge of the offices for the under-mentioned areas shall be as follows :—

Area.	Location.	Officer-in-charge.
For the State	Old Custom House, Bombay.	Chief Inspector.
For the Collectorates of Ahmedabad, Kaira, Broach and Panch Mahals and Surat.	Boiler Inspection Office, Ahmedabad.	Inspector.

Part I.

Boiler Inspection Administrative Rules.

II—Duties of the Chief Inspector.

5. *Administrative control.*—The Chief Inspector shall work under the administrative control of the Commissioner of Labour, Bombay, and shall submit to him—

(*a*) an annual report on the administration of the Act ;

(*b*) such other reports and returns as may be called for.

6. *Duty of general control.*—The Chief Inspector is vested with all the powers of an Inspector under the Act. His main duty, however, consists in supervising and controlling the work of the Inspectors, and he should only actually inspect or examine boilers in exceptional cases, or where he considers that the work of an Inspector requires a personal check.

7. *Specific duties.*—The Chief Inspector shall—

(*a*) personally check the registration particulars and calculations submitted by Inspectors for all boilers inspected for registration as prescribed in Part II of the Regulations and enter under his own signature the approved working pressure and all orders required by section 7 ;

(*b*) enter under his own signature any subsequent entries required in the registration book ;

(*c*) obtain from the province of registry the registration book of any boiler, the transfer of which is reported under section 6 (*b*) ;

(*d*) fix the area under the control of each Inspector ;

(*e*) approve the programmes of all inspectors subordinate to him with due regard to the convenience of owners generally ;

(*f*) examine and countersign the Inspectors' Memorandum of Inspection Book of each boiler after each inspection ;

(*g*) examine and pass orders on the diaries and returns of Inspectors ;

(*h*) pass orders in all cases in which an Inspector proposes to increase or reduce the pressure allowed for any boiler under section 8, or to revoke, cancel or refuse to renew the certificate of a boiler under section 11, or to order important repairs, structural alterations, or renewals in a boiler under section 8 ;

(*i*) pass orders in all cases in which it is reported that after due notice the boiler has not been properly prepared for inspection ;

(*j*) decide all appeals against the order of an Inspector under section 19 ;

(*k*) sanction prosecutions under the Act ;

(*l*) inquire into serious accidents to boilers.

8. *Instructions to owners.*—It shall be the duty of the Chief Inspector to advise owners as regards the maintenance, working and cleaning of boilers ; he should issue a set of instructions on the lines indicated in Form C of the Appendix. These instructions should be hung up in each boiler-house.

9. *Registers to be kept.*—The Chief Inspector shall keep in his office—

(*a*) a Register in Form A of all boilers registered in the State, or the registry of which has been transferred from another State ;

(*b*) the Registration Book and Memorandum of Inspection Book of all boilers borne on his register ;

(*c*) a Register of appeals ;

(*d*) a Register of accidents ;

(*e*) a Register of Registration and inspection fees received.

10. *Control of bills.*—The Chief Inspector shall be the controlling or countersigning authority in respect of all contingent bills and of travelling allowance bills of officers subordinate to him.

III—Duties of Inspectors.

11. *Subordinate to Chief Inspector.*—Inspectors shall be directly subordinate to and under the control of the Chief Inspector ; they should ordinarily be appointed to take charge of specific areas.

12. *General duties of Inspectors.*—The main duties of the Inspector, as laid down in the Act, are the inspection and examination of boilers and steam-pipes. Inspections shall be carried out in strict accordance with Part II of the Regulations and Chapters IV and V of these rules.

13. *Inspectors to see that boilers are worked according to law.*—In addition to the inspection and examination of boilers, it is the duty of Inspectors to search for unregistered or uncertificated boilers within their areas, and to see that certificated boilers are worked in accordance with the terms of their certificates, and with any regulation or rule under the Act for their safe working.

14. *Inspectors to advise owners.*—At the time of inspection, Inspectors should advise the owner and the person in charge of the boiler on the management and upkeep of the boiler with special reference to the amount of cleaning required in view of the quality of water used.

15. *Specific duties.*—Inspectors shall—

(*a*) when in charge of an area beyond the limits of the City of Bombay and adjacent districts, for which inspections are arranged from day to day by the Chief Inspector, prepare a programme of inspections with regard to the

convenience of owners generally in the most suitable order of places to save time and expenditure in cross journeys and submit it at such periods as may be prescribed at least 14 days before the first date fixed in the programme to the Chief Inspector for approval to enable the 10 days' notice required under sections 7 and 8 to be given to the owner ;

(*b*) maintain a Memorandum of Inspection Book for each boiler under their charge and submit it to the Chief Inspector for examination and countersignature after each inspection ;

(*c*) keep a diary for weekly submission to the Chief Inspector, showing places visited, boilers registered or inspected with fees paid thereon, variations from the programme and any other important particulars ;

(*d*) receive applications for registration or inspection under section 7 or 8, proposals for repairs, alterations or renewals under sections 12 and 13 and reports of accidents under section 18 ;

(*e*) inquire into accidents to boilers and steam-pipes and report to the Chief Inspector ;

(*f*) report to the Chief Inspector cases of unreported accident discovered at the time of inspection ;

(*g*) submit for the orders of the Chief Inspector—

(*i*) the Memorandum of Inspection Books of all boilers proposed for registration under section 7 ;

(*ii*) proposals for increasing or decreasing the pressure of a boiler after inspection under section 8 ;

(*iii*) proposals for necessary repairs, structural alterations or renewals to a boiler under section 8 or 12 ;

(*iv*) proposals for revoking, cancelling or refusing to renew a certificate under section 11 or 8 ;

(*v*) report when boilers have not been properly prepared for inspection under section 14 ;

(*vi*) proposals for prosecutions under the Act.

16. *Inspections at special times.*—No examination of a boiler shall be made by an Inspector for the purpose of registering or issuing a certificate for a boiler on a Sunday or gazetted public holiday or between the hours of sunset and sunrise without the specific orders of the Chief Inspector in each case.

In such cases an extra fee equal to the usual registration or inspection fee for the boiler may be charged and half of the extra fee may be paid to the Inspector.

17. *Attendance during hearing of appeals.*—Under orders of the Chief Inspector, Inspectors shall attend during the hearing of appeals with regard to boilers under their charge before the Chief Inspector or the Appellate Authority.

18. *Registers to be kept.*—Every Inspector in charge of an office shall keep—

(*a*) a Register in Form A of all registered boilers situated within his jurisdiction ;

(*b*) a Register of accidents,

(*c*) a Register of registration and inspection fees received.

IV—Administrative Instructions for Registration.

19. *Importance of registration.*—Technical regulations for the registration of boilers and the scale of fees for registration are prescribed in Part II of the Regulations. The details of measurements recorded at the time of registration constitute

a permanent record for the boiler and determine the original pressure at which the boiler is allowed to work. It is accordingly essential that the work should be done with the greatest care and precision.

20. *Receipt of applications.*—Applications for registration shall be made under section 7 (*1*) either to the Chief Inspector, or to the Inspector of the local area in which the boiler is situated and shall be accompanied under Rule 3 by a receipt for the prescribed fee. No application shall be accepted without the receipt. No boiler shall be registered, if on measurement the fee is found to be deficient, until the deficit has been paid. Any excess payment will be refunded at the time of boiler registration.

21. *Necessity of avoiding delay.*—It is essential that no delay should occur in registration. In large towns, the measurements under section 7 (*3*) should ordinarily be completed and the report submitted to the Chief Inspector within 7 days of the receipt of the application; in no cases should the interval exceed 30 days. The Chief Inspector should issue his orders under section 7 (*4*) without delay.

22. *Register of registered boilers.*—The Chief Inspector shall maintain a Register of registered boilers in serial order in Form A in two parts ; in Part I (boilers originally registered in the State) the registered number of a boiler shall be the one immediately following the last serial number in the Register. Gap numbers due to boilers being broken up or transferred to another State shall not be filled up. In Part II (boilers originally registered in other States) entries shall be made as prescribed in Rule 24. Inspectors in charge of an office shall keep a similar Register for all boilers within their jurisdiction.

23. *Procedure on transfer of a boiler.*—Whenever a boiler is transferred from another State into the State of Bombay the owner shall, under section 6 (*b*) apply to the Chief Inspector for the registration of the transfer ; the boiler cannot be used until registration has been effected. The Chief Inspector shall then obtain from the State from which the boiler was transferred the Registration Book and Memorandum of Inspection Book of the boiler. No fee shall be charged for recording transfers.

24. *Entry of transferred boiler in Register.*—On receipt of the Registration and Memorandum of Inspection Books, the Chief Inspector shall enter the boiler under its original number in Part II of his Register, and shall instruct the Inspector of the local area in which the boiler is situated to enter it similarly in his Register. The Registration Book and the Memorandum of Inspection Book shall be kept in the Chief Inspector's Office.

25. *Note of transferred and dismantled boilers.*—Whenever a boiler has been transferred to another State or broken up, the fact shall be noted in the Register. In the case of a boiler that has been permanently dismantled the Registration Book and the Memorandum of Inspection Book shall be destroyed.

V—Administrative Instructions for Inspection.

26. *Procedure at inspections : internal inspection.*—Detailed instructions for the inspection of boilers are contained in Part II of the Regulations. The following general procedure at inspections should be observed :—

At a thorough inspection of a boiler the Inspector should wherever the size and construction of the boiler permit, go inside and make a thorough inspection of all its internal parts. But before doing so he should satisfy himself that proper provision has been made for disconnection from any other boiler under steam.

Should he find that proper provision for disconnection has not been made or that the boiler has not been properly cleaned or scaled or that it is unreasonably hot he should decline to proceed with the inspection and should report the facts to the Chief Inspector for orders under section 14 (2) of the Act.

When a boiler is of such a size or its construction is such that the Inspector cannot go inside it there must be sufficient sight holes or hand holes provided to enable him to see the principal internal parts. If any important part of a boiler is so constructed that the Inspector cannot examine it he should report the facts to the Chief Inspector for orders.

27. *External inspection.*—Boilers must be examined externally as well as internally; particular attention should be paid to the external parts of the boilers where in contact with seating blocks and brick work, especially when the situation is damp. Having regard to many serious defects discovered, Inspectors should take care, in order to ensure proper inspection, that boilers of which the whole of the outside cannot be readily examined, are cleared whenever they consider it necessary of any concealing covering, supports or fittings.

Saddle tanks and engine fittings of locomotive type boilers should be removed for inspection of the parts underneath at the first inspection and at any reasonable period afterwards if the Inspector cannot satisfy himself. If the owners in any special case have any good reasons for not wishing to clear covered parts the case should be submitted to the Chief Inspector for orders. The Inspector must keep in mind that he is not to certify as efficient any boiler regarding the condition of which he cannot thoroughly satisfy himself.

28. *Casual working inspections.*—At the inspection of one of a battery of boilers the Inspector should take the opportunity of examining the other boilers under steam with special reference to the water gauges, pressure gauges and safety valves.

29. *Proposals for reduction of pressure.*—When the Inspector decides that a boiler in one or more of its parts is no longer fit for the pressure approved for it he should, without delay, report his proposals for reducing the pressure to the Chief Inspector and at the same time submit his calculations for the wasted parts for check and approval of pressure. With regard to pitting and wasting of shell plates the Inspector must bear in mind that shell plates ordinarily are considerably stronger in the body of the plate, owing to being unpierced, than at the seams and consequently may become reduced in thickness to an appreciable extent in the body of the plate, i.e., elsewhere than at the seams, and still be stronger than the seams.

30. *Repairs to boilers.*—Under section 12 of the Act the sanction of the Chief Inspector to all repairs proposed for boilers must be obtained beforehand.

A few water tubes or smoke tubes, however, may in an emergency be renewed pending the sanction of the Chief Inspector but all such cases must be reported immediately to the Chief Inspector who may, if he deems fit, notify his sanction to the owner without verification of the renewals by an Inspector.

Generally in repairing boilers the object to be obtained is to make up for damage or wastage by suitable compensation, either by renewal or repair of the part affected. Covering patches applied with the object of hiding defects are a source of danger and must not be passed.

Welding by electric and oxy-acetylene processes may be employed in the repair of boilers, but, as the efficiency of the welding depends largely on the skill and care of the operator each case will have to be decided on its merits.

Provided that when any owner is willing to accept a renewed certificate for less than twelve months in order to approximate the date of annual inspection to the date on which other boilers in the locality are inspected, a certificate for such period less than twelve months as may be necessary for such approximation of dates may be granted at a reduced fee to be calculated at one-twelfth of the ordinary fee for each full month, portion of a month not being reckoned.

40. *Fee to cover inspection and tests.*—A fee paid for the inspection of a boiler shall cover thorough inspection, hydraulic test and steam test where such are necessary, subject to the provisions of section 14 (*2*).

41. *Second fee in default.*—A second fee will be leviable for re-inspection in any case where the inspection of a boiler is begun, but, owing to the fault or neglect of the owner or person in charge, is not completed within a period of six months from the date of commencement of inspection.

42. *Sanction of Chief Inspector to second fee.*—No extra fee shall be levied. except with the sanction of the Chief Inspector.

43. *Special fee for inspections out of season.*—For any inspection of a boiler situate at a place beyond the limits of the cities of Bombay and Ahmedabad which is visited by an Inspector one or more times in a year for the purpose of inspecting boilers, if an owner or person in charge of a boiler fails to avail himself of the services of the Inspector during the usual periods for visiting the district and applies for inspection at a time which would necessitate a special journey by the Inspector then before the Inspector undertakes such a journey the owner or person in charge shall, in addition to the registration or inspection fee, pay such sum into the Government Treasury to cover the rail, conveyance and travelling allowance charges of the Inspector from the nearest head-quarters as the Chief Inspector may determine.

44. *Fee for copy of Registration Book*—

For each copy	...	...	...	... Rs. 10.

45. *Duplicate certificate fees.*—Fees for duplicate certificates under Rule 38—

For each	...	...	...	... Rs. 5.

46. *Refund of fees.*—Fees paid in excess and fees paid for an inspection which for any reason not due to any fault or omission of the owner or person in charge of the boiler has not been made, shall be refunded if a refund is applied for within one year from the date of payment.

VI—Accidents.

47. *Investigation of accidents.*—On receipt of a report of an accident to a boiler or steam-pipe under section 18, the Inspector should, with the least possible delay, proceed to the place to investigate the accident. If the report is received by the Chief Inspector, he should forward it at once to the Inspector, within whose jurisdiction the accident has occurred, for necessary action.

48. *Procedure during inquiry.*—The Inspector at his inquiry shall make a careful examination of the damaged parts, and shall take such measurements and make such sketches for the purpose of his report as he may deem necessary. He shall inquire into the circumstances attending the accident and note the time of its occurrence, its nature and extent, the injury caused to persons and the damage done to property. The report should be in the style of the Reports of Preliminary Enquiries under the British Boiler Explosions Acts, 1882 and 1890.

49. *Power to hold inquiry in writing.*—Inspectors are authorized to take the written statements of witnesses and all persons immediately concerned with the accident. In order to comply with the provisions of section 18 (*2*), the Inspector should present to the owner or person in charge of the boiler a series of written questions on all points that are material to the inquiry.

50. *Use of boiler after accident.*—The Inspector must decide whether the use of the boiler can be permitted at the same or at a lower pressure without repairs or pending the completion of any repairs or alterations that he may order. In no case should he issue a provisional order or renewal certificate, until his orders have been carried out.

51. *Procedure in case of serious accidents.*—The report should be sent without delay to the Chief Inspector ; if he considers that the investigation has been sufficient, he will record the facts in his register of accidents, and enter a brief account of the accident in the Registration book, a copy being made in the Memorandum of Inspection Book. If, however, the accident is of a serious nature and in all cases in which an explosion has occurred, the Chief Inspector should, after receipt of the Inspector's report, proceed to investigate the accident personally either alone or with the assistance of a member of the panel of assessors appointed under Rule 64 who may be appointed for this purpose by the Commissioner. Reports of such inquiries should be recorded as indicated above.

52. *Remuneration of assessor.*—The assessor shall be remunerated at such rate as may be prescribed by the State Government and be allowed the travelling expenses incurred by him in attending the inquiry.

53. *Reference in Annual Report.*—A brief account of all accidents and their causes should be included in the Chief Inspector's Annual Report.

54. *Unreported accidents.*—If, in the course of an inspection or at any other time, the Inspector discovers damage which comes within the definition of an accident, but which has not been reported should report the facts at once to the Chief Inspector for action under section 24 (*d*).

VII—Appeals.

55. *Filing of appeal.*—Every petition of appeal shall be made in writing either in English or in the vernacular.

56. *Presentation of appeal.*—An appeal may be presented either personally or by registered post to the Chief Inspector.

57. *Form of appeal.*—The petition of appeal shall be accompanied by the original order, notice or report appealed against, or by a certified copy thereof, or where no such order, notice or report has been made in writing, by a clear statement of the facts appealed against, the grounds of appeal and the referring section of the Act.

58. *Fixing date for hearing.*—On receipt of an appeal, the Chief Inspector shall, if the appeal is to be heard by himself, at once fix a date for hearing the appeal; and if it is to be heard by the appellate authority, obtain a date for the hearing of the appeal from the President of the Court. It is important that there should be no delay in the decision of appeals, as the stoppage of a boiler is likely to put the owner thereof to great inconvenience. The decision should ordinarily be given within ten days from the receipt of the petition of appeal.

59. *Procedure before hearing.*—When the date for hearing has been fixed, the Chief Inspector shall at once issue a notice to the appellant stating the date for hearing and informing him that if he wishes to be heard in support of the appeal or to produce evidence he must be present either in person or by authorised agent with his evidence on the date fixed. The notice shall be sent by registered post to such address as shall be entered in the petition of appeal.

60. *Presence of Inspector.*—In all appeals the Chief Inspector shall decide whether the presence of the Inspector is necessary, and shall issue orders accordingly.

61. *Attendance of witnesses.*—The Appellate Court shall have power to secure the attendance of witnesses and to make local inquiries under the provisions of the Code of Civil Procedure.

62. *Ex-parte decisions.*—If the appellant is not present on the date fixed, the appeal may be decided in his absence.

63. *President of Appellate Court.*—The State Government shall appoint an officer to be President of the Appellate Court for such period as it thinks fit.

The President shall be an officer who has exercised the powers of a judge or magistrate or a person who is a barrister, advocate, pleader or a graduate in law of any University in any country in the Commonwealth including India and has exercised or is exercising the powers of a court within the meaning of section 3 of the Indian Evidence Act, 1872.

64. *Panel of assessors.*—The State Government shall constitute a panel of assessors for the purpose of assisting in the hearing of appeals. Assessors must be fully qualified mechanical engineers.

65. *Constitution of Appellate Court.*—Whenever the date for an appeal before the Appellate Court has been fixed, the Chief Inspector shall, under the orders of the President of the Court, arrange for the attendance of three members of the panel constituted under the preceding rule to act as assessors.

66. *Costs in appeals.*—In appeals before the Appellate Court, the President is authorised to fix the costs and recover them from the appellant in any case in which the appeal is dismissed; in all cases of appeal in which a local inspecton is required by the appellant he shall deposit in advance the full costs of such inspection.

67. *Fees required for certificates granted on appeal.*—Any order on appeal authorising the registering of a boiler or the grant or renewal of a certificate shall be deemed to be subject to the payment of such fees as are prescribed by rules or regulations framed under the Act.

VIII—Inquiries into Conduct of Persons in charge of Boilers.

68. *Commissioner to hold inquiry.*—If the Commissioner has reason to believe from any cause whatever, that an inquiry should be made to ascertain whether a person in charge of a boiler is incompetent or addicted to drugs or drunkenness or has been guilty of any serious misconduct or negligence it shall be his duty to inquire into such allegation.

He may either make such inquiry personally or cause it to be made by a deputy.

69. *Appointment of Assessor.*—The Commissioner shall appoint as assessor in such inquiry either one of the panel of assessors for hearing appeals under section 20 or any fully qualified mechanical engineer who appears to the Commissioner to be a fit and proper person to be an assessor.

70. *Person concerned to be present at inquiry.*—The inquiry shall be held in the presence of the person whose conduct forms the subject of the inquiry who shall be allowed to make any statement he may wish to make and to produce evidence in his defence. He shall on demand forthwith give up his certificate to the Commissioner and abide the result of the inquiry.

71. *Record of inquiry.*—The Commissioner shall forward to the State Government the record of the inquiry together with the opinions of the officer conducting the inquiry and of the assessor and shall make such recommendation with regard to the suspension or cancellation of the person's certificate as he may think fit.

72. *Remuneration of Assessor.*—The assessor shall be remunerated at such rate as may be prescribed by the State Government and be allowed the travelling expenses incurred by him in attending the court.

Part II.

BOILER ATTENDANTS' RULES.

IX—Persons in charge of Boilers.

73. *No boiler to be used without competent person in charge.*—Subject to the proviso below no boiler as defined in section 2 (*b*) that is liable to inspection under the Act shall be used (see Rule 78) within the State of Bombay unless there is a fit and proper person in immediate attendance and charge who is employed by the owner for the purpose of attending to the working of the boiler :

Provided that the restrictions contained in this Rule shall not apply to a boiler of such capacity and used for such purpose as may be specified by the State Government by notification in the *Bombay Government Gazette.*

74. *Competent person must possess certificate, extent of qualification.*—No person who does not possess a certificate of competency or a certificate of service granted under these Rules or under the Bombay Boiler Inspection Act, 1917, shall be deemed a fit and proper person to be in attendance and charge of a boiler ; and no holder of any such certificate shall be deemed a fit and proper person to be in attendance and charge of any boiler except to the extent of his qualification indicated by his said certificate :

Provided that in respect of a boiler of any capacity worked by the military authority a person holding a certificate of competency as Boiler Attendant issued by a competent military authority shall, while he is in military employment and working under the sole control of the military authority, be deemed a fit and proper person to be in attendance and charge of the boiler:

Provided further that in respect of a boiler of any capacity worked within the area formerly forming part of the merged State of Baroda a person holding a certificate of competency issued by a competent authority under the Baroda Boilers Act, 1926, shall, to the extent of his qualification indicated by the said certificate, be deemed a fit and proper person to be in attendance and charge of such boiler within the said area for a period of three years with effect from 1st August 1949.

75. *Holder to produce certificate when called for by authorised person.*—The holder of a certificate shall at any reasonable time during his charge of a boiler produce his certificate when called upon to do so by any of the persons empowered under section 15 to call for the production of the certificate or provisional order of the boiler.

76. *Owner to furnish Chief Inspector with particulars of certificate.*—Any owner of a boiler who engages a person to be in charge of it shall at once furnish to the Chief Inspector particulars of the person with the grade, number, date and place of issue of his certificate.

77. *Limits of daily period of attendance, reliefs allowed and sphere of action.*—The hours of a boiler attendant are regulated by the Factories Act, 1934 (XXV of 1934) and the rules framed and exemptions granted thereunder.

An attendant in charge of boilers for which a certificate of the first class is required may be relieved of charge in any one day for not more than two periods which combined are not to exceed two hours in duration by a person holding a certificate of the second class.

In special cases, the holder of a first class certificate may, with the consent in writing of the Chief Inspector or District Inspector, be relieved by a person holding a certificate of the second class for a period which may extend to seven consecutive days.

A person in charge of a boiler will be held to be in immediate attendance and charge of the same when he is within one hundred and fifty feet of such boiler.

78. *When boiler is deemed to be in use.*—A boiler will be deemed to be in use when there is active fire in the furnace, firebox or fireplace for the purpose of heating the water in the boiler. When the fire is removed, extinguished, or effectively banked so that no appreciable heat passes from the fire to the water and all steam and water connections are closed, a boiler will be deemed to be not in use.

X—Certificate.

79. *Capabilities of holders of certificates.*—Certificates of competency granted under these rules shall be of two classes. A certificate of the first class shall qualify the holder thereof to be in charge of a set of connected boilers of any kind or capacity or of so many separate or connected boilers belonging to the same owner so situated that no one of them is distant more than 150 feet from any other of them, and a certificate of the second class shall qualify the holder thereof to be in charge of any single separate boiler.

80. *Equivalence of certificates.*—Holders of certificates of proficiency granted under Part III of these Rules and holders of certificates of competency or of service as first and second class engineers granted under the Bombay Boiler Inspection Act will, for the purpose of Rule 74, be deemed to hold certificates of competency of the first class under Part II of these Rules and holders of certificates of

competency or of service as third class engineers granted under the Bombay Boiler Inspection Act will be deemed to hold certificates of competency of the second class under Part II of these rules.

81. *Exchange Certificates.*—Any person in possession of a certificate of competency granted by any competent authority in India or in the United Kingdom, or in any British Dominion or Colony, shall be entitled to receive a certificate of competency as aforesaid without undergoing examination.

The certificate granted under this rule shall be of such class as the board of examiners or a majority of the members of the said board on consideration of the nature of the certificate in the person's possession shall determine.

82. *Service certificate.*—The Board may, in the case of any person who satisfies it that he has served for a period of not less than ten years as a boiler attendant or head fireman in working charge of a set of boilers or that he has served for a period of not less than six years in working charge of a separate boiler prior to the date on which these rules come into force and that he is possessed of competent practical skill for such work, grant to him certificate of service to the effect that he is qualified to the like extent as the holder of a certificate of competency of the first class or of the second class respectively.

Such certificate of service shall be signed as in the case of a certificate of competency.

A certificate of service so granted shall have the same effect as a certificate of competency granted under these rules.

XI—Board of Examiners.

83. *Examinations to be held by board of examiners.*—Examinations shall be held periodically by a board of examiners at such places and on such dates as the State Government shall determine, for the purpose of determining the fitness of persons who desire to qualify as attendants on boilers.

84. *Nomination of Members.*—The State Government shall from time to time nominate competent engineers having knowledge of primemovers and boilers to be members of the board of examiners for the said examinations.

85. *Passed applicants to receive certificate.*—Every applicant for examination who is declared by the said board to have passed an examination shal receive a certificate of competency in accordance with the board's decision as to his qualifications, which shall be signed by the members of the board.

86. *Board empowered to refuse issue of certificate.*—The board is empowered to refuse the issue of a certificate of competency or service to any candidate who in the opinion of the majority of the members appears too old or physically unfit through deformity, constitutional weakness, bad eyesight, deafness or loss of a limb to perform properly tne duties of a boiler attendant.

Any such candidate may appeal to the Commissioner against the decision of the board and the Commissioner may send the candidate oefore a Medical Board or Civil Surgeon for medical examination in which case the board shall either issue or refuse to issue a certificate in accordance with the medical opinion.

87. *President of the Board.*—The Commissioner of Labour, Bombay, shall ordinarily be *ex-officio* President of the Board of examiners.

He may delegate his powers as President in Bombay or any other place at which examinations are held and his deputy shall see that the examinations are conducted as prescribed in these Rules.

88. *Meetings of Members.*—Members of the board shall meet at the request of the Commissioner or his deputy for the purpose of conducting examinations in such place and at such time as may be specified in the notice of meeting.

89. *Minimum number of members.*—Each examination shall be conducted by not less than two members of the Board.

90. *Board's endorsement on application form.*—The board shall endorse on the printed application form of each candidate the result of his examinations for a certificate of competency or its decision in regard to application for exchange and service certificate. The endorsed applications shall be returned to the President at the close of the examinations.

91. *Fees to Members.*—Each member of the board shall be entitled to a fee of sixty rupees for each meeting of the board lasting more than three hours or a fee of thirty rupees for each meeting lasting less than three hours at which any duties prescribed in these rules in relation to certificates of competency as boiler attendant has been performed and which he had attended from the beginning to the end.

XII—Examinations.

92. *Kinds of examination.*—Examinations shall be of two kinds, one for each class of certificate of competency which the board is empowered to grant, namely, certificates of competency as first class boiler attendant and as second class boiler attendant.

93. *Times and places of examination.*—Examinations shall be held at Bombay, and at such other places as the State Government may, from time to time, determine.

Examinations at Bombay shall be held on the second Monday in the months of February, June and October.

94. *Postponement of examination.*—When a gazetted holiday falls on the date fixed for the examination, or when for any unforeseen reason an examination cannot be held on the date fixed for it, the Commissioner may fix some other day for holding the examination, which shall be duly notified to the candidates for examination.

95. *Clerical assistance at examinations.*—Every examination shall be attended by one or more clerks from the Commissioner's office who shall do such clerical work as may be necessary and shall act as interpreter when required by the board.

XIII—Applications for Examination.

96. *Form of application.*—Every applicant for examination must make application in Form 1 prescribed in the Appendix. He shall fill in those parts of the form that are to be filled in by a candidate and either sign, or mark his thumb impression, on the form in the presence of the Commissioner or his Deputy or a Magistrate or Justice of the Peace who shall append his signature in token of attestation.

97. *Lodging application.*—The applications must be lodged at the office of the Commissioner not later than fifteen days before the date fixed for the examination and be accompanied by—

(*a*) originals and copies of all testimonials ;

(*b*) a receipt from a Government Treasury or the Reserve Bank of India situated in the State of Bombay for the amount of the fee prescribed hereunder for the examination at which the applicant wishes to appear ; and

(*c*) any certificate granted to the applicant under these Rules or the Bombay Boiler Inspection Act or by an authority deemed competent under these Rules.

98. *Fees for examination.*—Candidates for examination for certificates of competency shall pay fees as follows :—

	Rs.
Examination for 1st class certificate	20
Examination for 2nd class certificate	15

99. *Remission of fee.*—Candidates once admitted to examination shall not be entitled to any remission of fees if they fail to pass or to proceed with the examination. Where a candidate is unavoidably absent from the examination on the date fixed the Commissioner may allow him to appear without payment of a second fee at any one of the subsequent examinations held within one year of such first examination.

100. *Fees of candidates found ineligible.*—Candidates found ineligible for any examination may be allowed to appear without payment of a second fee at any one of the subsequent examinations held within one year from the date of payment of fee or they may apply for a refund of the fee within the same period.

XIV—Testimonials.

101. *Candidates must produce satisfactory testimonials.*—No applicant shall be admitted to examination who cannot produce satisfactory testimonials certifying to his experience, ability, sobriety and general good conduct for the whole period of his qualifying service. Breaks in the qualifying service period must be accounted for satisfactorily. Should a candidate allow more than one year to elapse between the end of the period covered by his last testimonial and the date of his application for examination he will not be allowed to sit for examination until he produces a testimonial for a further period of service of six months.

102. *Essential statements.*—Testimonials must clearly state the capacity in which the candidate was employed, whether as boiler attendant, head fireman, donkeyman or fireman and show the dates between which the candidate was so employed.

103. *Signature and countersignature.*—Testimonials must be signed by the engineer under whom the candidate was employed or, if not employed under an engineer, by the responsible person under whom he worked and must be countersigned by the mill manager or by the owner, agent or secretary of the mill or factory or workshop as the case may be.

104. *Railway service.*—Testimonials for service on railway locomotives must be signed by the responsible officer under whom the candidates served and be countersigned by the head of the department concerned.

105. *Sea service.*—Testimonials for service on steam ships may be signed by the chief engineer and countersigned by the master of the vessel or may be in the form of a seaman's discharge issued by a Shipping Master.

106. *Candidates for certificates of service.*—Testimonials of candidates for certificates of service under these Rules must comply with the requirements specified herein for testimonials of candidates for examination.

107. *Doubtful testimonials to be authenticated.*—In any case of doubt the board may require a candidate's testimonial to be authenticated by the testimony of some credible person having personal knowledge of the facts required to be established.

108. *False testimonials.*—Where the Commissioner is satisfied that any testimonial tendered by a candidate is false he may by written order debar such candidate from being admitted to any subsequent examination held under these rules and if upon tender of such testimonial a candidate has already been admitted to examination he shall be deemed to have failed in such examination.

109. *Filing of copies and return of originals.*—Applications and copies of testimonials submitted by candidates shall be filed in the office of the Commissioner. The original testimonials shall be returned to the candidates at the close of the examination. Copies of testimonials shall be obtainable on payment of copying charges on application to the Commissioner.

XV—Age and Training.

110. *Age and training of second class candidates*—A candidate for a certificate of competency as a boiler attendant of the second class must not be under twenty years of age and shall not be admitted to examination unless he proves to the satisfaction of the board that he—

(*a*) can read English numerals or can read letters in his own mother-tongue or in any regional language of the State and ;

(*b*) has served for not less than three years as a fireman or attendant on a steam boiler or as a driver on a combined steam engine and boiler ; or

(*c*) has fulfilled the requirements of any of the prescribed courses of training which would qualify him for admission to the examination for third class engineers, under the Bombay Boiler Examination Rules, 1903, if at the time of introduction of these rules he had begun and was engaged in such training.

111. *Age and training of first class candidates.*—A candidate for a certificate of competency as a boiler attendant of the first class must not be under twenty-five years of age and shall not be admitted to examination unless he possesses or is able to claim a certificate of competency or of service as third class engineer granted under the Bombay Boiler Inspection Act, or proves to the satisfaction of the board that he has received such training as is required under the preceding Rule in the case of a candidate for a certificate of the second class and possesses or is able to claim a certificate of competency of the second class or a certificate service of the second class and in addition thereto—

(*a*) has served for not less than two years as an engineer with a third class certificate of competency or of service ; or

(*b*) has served for not less than three years as a boiler attendant with a second class certificate of competency or of service in sole working charge of a boiler of Lancashire, Cornish, Water-tube or Marine type of not less than 500 square feet heating surface ; or

(*c*) has served for not less than three years as fireman serang on a battery of two or more boilers of Lancashire, Cornish, Water-tube or Marine type each of not less than 500 square feet heating surface ; or

(*d*) has served for not less than three years as a fireman serang or tindal on a steamship with one or more boilers each of not less than 500 square feet heating surface.

112. *Service not in strict conformity with Rules.*—In any case in which the service of a candidate does not strictly comply with any one of the clauses specified under Rules 110 and 111 but is not less than the total period required under either rule the board of examiners may accept such service on its merits as the board may deem fit.

XVI—Examination Subjects.

113. *Second Class.*—To be entitled to a second class certificate of competency a candidate must satisfy the examiner that—

(*a*) he clearly understands—

(*i*) the working and management of a steam boiler ;

(*ii*) the use and purpose of the various valves, cocks, mountings and fittings ;

(*iii*) the precautions to be taken and procedure to be observed before starting fires and when raising steam ;

(*iv*) the use of a feedpump and injector ;

(*v*) the use and purpose of a salinometer and thermometer ;

(*vi*) the need for periodical cleaning and pure water supply and for the prevention of scale and other deposit on the heating surfaces ;

(*vii*) the need for periodical inspection of boilers and the manner in which they should be prepared for thorough inspection, hydraulic test and steam test ;

(*viii*) the precautions to be taken before entering or allowing another person to enter a boiler that is connected to another boiler under steam ;

(*ix*) the use of the best means of firing for the prevention of smoke ;

(*x*) the danger of water lodging in steam pipes and the precautions to be observed in draining ;

(*xi*) the procedure to be followed in the event of shortness of water-bulging or fracture, of furnaces or flat plates or bursting of tubes or of any accident to a boiler or steam pipe, and that—

(*b*) he is able—

(*i*) to stoke a boiler, including cleaning and banking fires, in a workmanlike manner ;

(*ii*) to show how avoidable smoke may be prevented ;

(*iii*) to blow through and test correctness of water gauge glasses and test cocks ;

(*iv*) to replace a gauge glass and show how a false water level might be shown;

(*v*) to ease a safety valve and use a blow down cock or valve ;

(*vi*) to adjust a high steam and low water safety valve and renew a fusible plug ;

(*vii*) to joint a manhole or handhole door or any cover or flange in the steam or feed pipes ;

(*viii*) to pack pump or valve chest glands ;

(*ix*) to grind and adjust cocks and valves ;

(*x*) to take a donkey pump or injector to pieces and replace in working order.

114. *First Class.*—To be entitled to a first class certificate of competency a candidate must satisfy the examiner, in addition to the subjects prescribed for second class candidates, that he has at least a rudimentary knowledge of—

(*i*) the principal elementary facts relating to combustion, heat and steam ; and that he is able to some extent, to explain—

(*ii*) the principal causes and effects of corrosion and incrustation and the usual remedies employed ;

(*iii*) the object of the use of boiler fluids ;

(*iv*) the principles on which feed pumps and injectors work ;

(*v*) the principles on which appliances for the prevention of smoke work ;

(*vi*) the purpose of superheaters, economisers, feed heaters, feed filters, forced and induced draught appliances and mechanical stokers.

XVII—Mode of Examination.

115. *Nature of examination.*—Every examination shall be of such a nature as to test the practical knowledge of the candidate and to ascertain his competency to manage a boiler or boilers.

116. *Examination in writing optional.*—The examination shall be conducted orally but any candidate may, if he desires, write his answers to such written questions as may be given to him by the examiner.

117. *Examination where held.*—The examination shall be held either in a factory, mill or workshop in which boilers are used or partly in such factory, mill or workshop and partly in the examination room.

118. *Practical test essential.*—Every candidate must demonstrate on an actual boiler or fitting or model his ability to perform any or all of the practical tests under Rule 113 (*b*).

119. *Hours of examination.*—Examinations shall be conducted in the examination room between the hours of 11 a.m. and 5 p.m. unless otherwise notified by the Commissioner and elsewhere at such time as the examiner may fix.

XVIII—Grant of Certificates.

120. *Forms of certificates.*—Certificates of competency, exchange and service shall be in Forms II, III and IV in the Appendix to these Rules.

121. *Surrender of lower grade certificate.*—No certificate of the first class shall be granted to the holder of a second class certificate after examination under these

Rules unless and until he has surrendered to the Commissioner the certificate of the lower grade.

122. *Exchange certificate.*—An exchange certificate of competency shall be granted only in respect of and on production of a certificate issued after examination by a competent authority (Rule 81). The fact of the fresh certificate having been granted shall be endorsed on the original qualifying certificate before its return to the owner.

123. *Identification requirements.*—Every certificate granted under these Rules whether of competency, exchange or service shall bear a bust photograph of the holder, for which the candidate must sit after passing the examination or obtaining the board's acceptance as the case may be, and his signature or thumb impression and such other particulars as may be required for the purpose of identification.

The Commissioner's office shall arrange for the attendance of persons to be photographed. No extra charge shall be made to the candidates for the photographs.

124. *Duplicate of certificates recorded.*—Duplicates of all certificates granted to boiler attendants under these Rules shall be recorded in the office of the Commissioner.

125. *Grant of duplicate certificates.*—Whenever any boiler attendant proves to the satisfaction of the Commissioner that he has, without fault on his part, lost or been deprived of any certificate granted to him under these Rules, or under the Bombay Boiler Inspection Act, a duplicate of the certificate to which by the record so kept as aforesaid he appears to be entitled shall be furnished to him, which shall have for all purposes the same validity as the original certificate.

126. *Applications for duplicate certificates.*—Applications for duplicates of certificates under the preceding Rule shall be lodged with the Commissioner together with a declaration describing the lost certificate.

127. *Fee for duplicate certificates.*—Applicants for duplicates of certificates of any class or kind granted under these Rules or under the Bombay Boiler Inspection Act shall pay a fee of Rs. 10 for each certificate.

128. *Invalidity of original certificate.*—On the issue of a duplicate certificate the original certificate shall be deemed invalid and if found should be returned to the office of issue for cancellation.

XIX—Exchange Certificates.

129. *Applications for exchange certificates.*—Applications under Rule 18 for certificates of competency corresponding to foreign certificates in the possession of the applicants shall be in Form 1 of the Appendix. Each applicant shall duly fill in the form which, together with the original foreign certificate in his possession and its copy and a receipt from a Government Treasury or the Reserve Bank of India in the State of Bombay for the amount of the fee prescribed below, shall be lodged with the Commissioner at least ten days before any meeting of the board of examiners.

Provided, that where the Commissioner is satisfied that delay in the issue of a certificate would cause hardship and is not due to the applicant's negligence the Commissioner may receive such application at any other time. In such case the

Commissioner shall refer the application to at least four members of the board of examiners in Bombay or to at least two members elsewhere, and on receipt of their signature to the certificate, shall deliver the certificate to the applicant after the usual process of identification has been carried out.

130. *Fee for exchange certificate.*—Applicants for certificates of competency in exchange shall pay a fee of Rs. 7-8-0 for each certificate irrespective of class.

XX—Certificates of Service.

131. *Applications for certificates of service.*—Applications under Rule 82 for certificates of service shall be in Form I of the Appendix. Each applicant shall duly fill in the form which, together with his testimonials and their copies and a receipt from a Government Treasury or the Reserve Bank of India in the State of Bombay for the amount of the fee prescribed below, shall be lodged with the Commissioner at least ten days before any meeting of the board of examiners.

The proviso to Rule 129 shall also be applicable to this Rule.

132. *Candidates' practical skill may be tested.*—If on scrutiny of the testimonials of an applicant for a certificate of service under Rule 82, the board of examiners has doubts about the competence of the applicant for the charge and management of a boiler, or if it is necessary to determine the class of certificate for which he is qualified, the board of examiners may subject the applicant to such practical examination as it deems fit.

133. *Fee for certificate of service.*—Applicants for certificates of service shall pay a fee of Rs. 7-8-0 for each certificate irrespective of class :

Provided that any fee so paid by an applicant who is found to be ineligible for the grant of a certificate by reason of the insufficiency of his testimonials of previous service, may, if applied for within one year of the date of payment, be returned to him in full.

XXI—Penalties.

134. *Penalties.*—The owner of any boiler liable to inspection under the Act who shall—

(*a*) work the same or permit the same to be worked at any time, except whilst he has in his employ in immediate attendance and charge for the purpose of attending to the working of the boiler a fit and proper person to be in attendance and charge thereof ;

and any such person in charge or any other person who shall—

(*b*) work the same or permit or cause it to be worked in contravention of section IX of these Rules ; shall be punishable with fine which may extend to one hundred rupees for each offence and in the case of a continuing offence with an additional fine which may extend to one hundred rupees for each day after the first day in regard to which he is convicted of having persisted in the offence.

135. *Cognisance of offences.*—All offences against these Rules shall be cognisable in the City of Bombay by a Presidency Magistrate, and elsewhere by a Magistrate of the first class.

136. *Limitation and previous sanction for prosecution.*—No charge shall be brought against any person of any offence punishable under these Rules except within six months from the date of the commission of the offence and no prosecution shall be instituted without the previous sanction of the Chief Inspector.

Part III.

XXII—Engineers' Examination Rules.

137. *Examinations where and when held.*—Examinations for persons desirous of obtaining certificates of proficiency as engineers to be in charge of steam engines and boilers shall be held at such times and in such places as may be notified in the *Bombay Government Gazette* :

Provided that unless the Commissioner of Labour, Bombay, shall by notification in the *Bombay Government Gazette* make an announcement to the contrary, they shall be held at Bombay by the Board of Examiners appointed under these rules on the second Monday in February, June and October at the same times and places as those prescribed in Part II for boiler attendants :

Provided also that such examinations shall be held at least once in any calendar year in Bombay if any candidate appearing to the Commissioner to be eligible applies for admission to them.

137-A. *Fees to members.*—Each member of the board shall be entitled to a fee of seventy-five rupees for each meeting of the board lasting more than three hours or a fee of thirty rupees for each meeting lasting less than three hours at which any duty prescribed in these rules in relation to certificates of proficiency as engineers has been performed and which he had attended from the beginning to the end.

138. *Application procedure.*—The same general procedure with regard to testimonials, applications and kindred matters shall be observed for these examinations.

139. *Kinds of examinations.*—Examinations for engineers shall be of two kinds, one for first class certificates of proficiency and one for second class certificates of proficiency for which fees of Rs. 40 and Rs. 25, respectively, are prescribed.

140. *Testimonials.*—Candidates must produce satisfactory testimonials which must clearly state the kind of work on, and the capacity in, which the candidate was employed, whether as apprentice engineer, engine fitter, assistant engineer or engineer and show the dates between which the candidate was so employed. Only service as an engineer, or engine fitter on steam machinery or as a mechanical engineering student will be considered by the board for admission to examinations for certificates of proficiency.

Testimonials must be signed as in the case of applicants for certificates of competency as boiler attendants, that is, they must be signed by the responsible person under whom the candidate worked and be countersigned by the owner, agent or manager of the workshop or factory or person of corresponding status elsewhere.

Candidates who have undergone a course of training at an engineering college or technical institute must produce either the diploma of the institution or a certificate from the Principal or Superintendent of the institution for the time served.

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XXIII—Age and Training.

141. *Age and training of second class candidates.*—A candidate for a certificate of proficiency of the second class must not be under 21 years of age and shall not be admitted to examination unless he proves to the satisfaction of the board that he has served or undergone, for not less than five years, the service or training specified in clauses (*a*), (*b*) and (*c*) below, of which not less than three years must have been in accordance with either clause (*a*) or clause (*b*) and not less than two years in accordance with clause (*c*)—

(*a*) as a full-time apprentice engineer or engine fitter in a suitable workshop on the making or repairing of steam engines or accessories; or

(*b*) a full course of training in an engineering college or technical institute recognised by the State Government as suitable for the training of mechanical engineers; and

(*c*) as engineer or assistant engineer in a mill or factory or steamship with engines and boilers, the boilers being not less than two in number and each of not less than 500 square feet heating surface.

142. *Unsuitable workshops, minimum equipment.*—No seasonal factory, cotton ginning factory or cotton pressing factory shall be recognised as a suitable workshop for the training of apprentice engineers or engine fitters nor shall any other workshop be recognised that is not equipped with at least two turning lathes, one planning, shaping or slotting machine, one drilling machine, one smiths' hearth and tools and all the necessary fittings and machine tools.

143. *Doubtful suitability.*—In any case of doubt of the suitability of a workshop the board may require a candidate to provide proof that the workshop in which he served was sufficiently equipped with machines and tools and that the work carried on was in making or repairing steam engines or accessories.

144. *Definition of apprentice service.*—For the purpose of these Rules service as an apprentice engineer means the regular performance of such duties in a workshop where steam engines or accessories are made or repaired as will enable a person to obtain under efficient supervision a practical knowledge of the various operations in the making or repairing of steam engines and to acquire practical experience in the use of tools and in the making and fitting together of parts of machinery.

Although some practical knowledge of moulding, blacksmithing and drawing office work is highly desirable not more than six months will be allowed for time spent in any one of these branches in making up the total apprentice service.

145. *Definition of engine fitter service.*—Service of engine fitter means journeyman's service in making or repairing steam engines or accessories. Such service may include service as turner, if employed on the same kind of work, but not more than one-half of the qualifying period will be allowed for time spent as turner in making up the total journeyman's service.

146. *Short periods of service.*—No period of less than six months spent in any workshop or factory as apprentice engineer or journeyman fitter shall count as time qualifying for admission to examination.

147. *Breaks in student's course.*—A course of training begun at an approved engineering college or technical institute may be continued and completed at any other approved college or institution but only complete and continuous annual courses will be allowed for in making up the full course.

In such cases candidates must produce a certificate from each Principal or Superintendent of the institution concerned for the time spent under him.

148. *Service as engineer.*—Service as an engineer or assistant engineer means service in those capacities only which afford opportunities of obtaining practical experience as an engineer on steam engines, boilers and steam plant generally in their working and maintenance. It does not include service as a fireman, boiler attendant, engine attendant or engine driver.

149. *Age and training of first class candidates.*—Subject to the proviso below, a candidate for a certificate of proficiency of the first class must not be under 23 years of age and shall not be admitted to examination unless he proves to the satisfaction of the board that he has received such training as is required by Rule 141 in the case of a candidate for a certificate of the second class and possesses or is able to claim a certificate of the second class and in addition thereto has served after having obtained such certificate for not less than one year as engineer in charge of steam plant, the boilers being not less than two in number and each of not less than 500 square feet heating surface.

Proviso for direct admission.—Provided that any applicant who has fulfilled the training requirements prescribed in Rule 141 for candidates for a certificate of the second class and in addition has served for not less than three years in the position prescribed in this Rule, may be admitted direct to examination for a certificate of the first class although he has not obtained a certificate of the lower grade.

XXIV—Examination Subjects.

150. *Subjects for second class.*—To satisfy the board in examination and be entitled to a certificate of proficiency of the second class a candidate must—

(*a*) write a legible hand, understand the use of arithmetic to the extent of addition, substraction, multiplication, division and proportion and be able to apply the same to the calculation of elementary stresses, pressures, areas, volumes, quantities and weights ;

(*b*) be able to give a description of the principal types of steam boilers used on land and to state the purposes and reasons for which different types of boilers are employed ;

(*c*) be able to give a description of and explain the functions of boiler mountings, feed pumps, feed injectors, feed filters, feed heaters, economisers, superheaters and forced draught and induced draught appliances ;

(*d*) know the causes and effects of, and the usual remedies for, incrustation and corrosion in boilers ;

(*e*) be able from data and formulae supplied to calculate the percentage of strength of a single or double riveted seam of a boiler shell and the safe working pressure to be allowed for shells, furnaces, fireboxes, flat plates and stays in accordance with the Indian Boiler Regulations. He must also be able to calculate the load on a dead weight safety valve, the weight and position of ball on a lever-and-weight safety valve and the total heating surface of a boiler from given data ;

(*f*) possess a creditable elementary knowledge of the prominent facts relating to combustion, heat and steam and be able to calculate consumption of coal and water and to estimate the quantity of steam that may be generated from a given grate area or heating surface in any of the ordinary types of land boilers ;

(*g*) be able to give a description of the principal types of steam engines in general use on land and pass a creditable examination in their constructive details and in the function of each part including governor and fly-wheel;

(*h*) be able to explain the whole cycle of operations of the steam from the time it leaves the boiler until it returns in the form of feed water, through an ordinary compound slide valve engine and condenser;

(*i*) be able to calculate direct tension and compression stresses in engine bolts and rods, the force exerted by pistons, pump buckets and plungers, the duty of pumps and the cubic capacities or weights of contents of tanks, bunkers and coal bins or stacks;

(*j*) be able to explain the method of testing and altering the setting of an ordinary slide valve and of testing the alignment of shafting, driving wheels and fly-wheels and adjusting them;

(*k*) be able to state how a temporary or permanent repair could be effected in case of derangement or breakdown of a part of an engine or its accessories;

(*l*) be able to make an intelligible sketch and to read a working drawing of a steam engine, boiler or boiler mounting;

(*m*) have a knowledge of some of the appliances used for the prevention or abatement of smoke and the principles on which they are based; and

(*n*) if required by the examiner, demonstrate by a practical test in the examination room or in a workshop his ability as a workman in the use of tools and appliances.

151. *Subjects for first class.*—To satisfy the board in examination and be entitled to a certificate of proficiency of the first class a candidate must, if not in possession of or able to claim a certificate of the second class, be able to satisfy the requirements prescribed under the preceding Rule for second class candidates and all candidates must—

(*a*) write a legible hand, understand the use of arithmetic and algebra to the extent of addition, substraction, multiplication, division, proportion, vulgar and decimal fractions, extraction of square and cube roots and simple equations and be able to apply the same to the calculation of stresses, pressures, areas, volumes, quantities and weights;

(*b*) be able to give a description of the principal types of steam boilers used on land and to state the purposes and reasons for which different types of boilers are employed;

(*c*) be able, from data and formulae supplied, to calculate the safe working pressure for any part of a boiler in accordance with Indian Boiler Regulations;

(*d*) understand how to correct defects in boilers due to accident, decay and other cause and know the means of repairing such defects;

(*e*) know the causes and effects of and the usual remedies for incrustation and corrosion in boilers;

(*f*) be able to give a description of and explain the functions of boiler mountings, feed pumps, feed injectors, feed filters, feed heaters, economisers, superheaters and forced draught and induced draught appliances;

(*g*) possess a creditable knowledge of the prominent facts relating to combustion, heat and steam;

(*h*) have a knowledge of the principal appliances in use for the prevention of smoke and the principles on which they are based and be able to give a description of the principal mechanical stokers and oil fuel systems in use;

(*i*) be able to estimate the evaporative capacity of a boiler from its fire grate area and total heating surface and the horse power that would be developed in the principal types of engines when supplied with steam at a certain pressure from the boiler ;

(*j*) pass a creditable examination in the various constructions of steam engines in general use and in the details and use of each part ;

(*k*) be able to explain the method of testing and altering the setting of engine valves and of testing the alignment of shafts and adjusting them ;

(*l*) be able to calculate the direct stress, the torsional stress and the binding stress in round bars and shafts and the bending stress in rectangular bars and levers with given loads :

(*m*) be able to explain jet and surface condensation, superheating and the working of steam expansively ;

(*n*) be able to take off and calculate indicator diagrams, recognise faults in them and suggest the appropriate remedies ;

(*o*) be able to make an intelligible hand sketch or a working drawing of one or more of the principal parts of a steam engine or boiler or boiler mounting and to mark in without a copy all the necessary dimensions in figures so that the sketch or drawing could be worked from ;

(*p*) be able to read a working sketch or drawing of any part of a steam engine, boiler or boiler mounting ;

(*q*) be able to explain the general construction of auxiliary machinery, viz., pumps, electric light engines, dynamos and plant, gas and oil engines and gas producers and the elementary principles on which they act ;

(*r*) be able to state the general methods employed in laying foundations for engines, machinery, boilers and chimneys and the suitable area and height of chimneys to promote efficient combustion and prevention of smoke ; and

(*s*) be able to state how a temporary or permanent repair could be effected in case of derangement of a part of the machinery or boiler.

XXV—Mode of Examination.

152. *Nature of examination.*—Examinations for certificate of proficiency as engineers to be in charge of steam engines and boilers shall be of such a nature as to test the practical and technical knowledge of the candidates and to ascertain their fitness for the charge of steam plant and machinery.

153. *Order of subject for second class examination.*—Examinations for second class certificates shall be conducted in the following order and stages :—

(*a*) to write answers within a prescribed time to ten questions in arithmetic set with reference to clauses (*a*), (*e*), (*f*) and (*i*) of Rule 150 ;

(*b*) to write answers to ten questions set by the examiners appertaining to the subjects specified in clauses (*b*), (*c*), (*d*), (*f*), (*g*), (*h*), (*j*), (*k*), (*l*) and (*m*) of Rule 150, eight of which shall be compulsory ; and

(*c*) to answer orally questions appertaining to clauses (*b*), (*c*), (*d*), (*f*), (*g*), (*h*), (*j*), (*k*), (*l*), (*m*) and (*n*) of Rule 150, to make the sketch or read the working drawing prescribed in clause (1) of Rule 150 and, if required by the examiner, to undergo the practical test specified in clause (*n*) of Rule 150.

154. *Assessment of work.*—The value of the work done in all three sections prescribed under clauses (*a*), (*b*) and (*c*) of Rule 153, namely, mathematics, written questions and oral questions (including practical test) will be assessed in accordance with the following scale :—

Marks 0 to 55=weak denoted by W.

Marks 56 to 64=consider denoted by C.

Marks 65 to 74=good denoted by G.

Marks 75 to 100=superior denoted by S.

In order to pass a candidate's work should be " good " in all three sections but it must be " good " or " superior " in the oral examination. A " consider " in mathematics or " written questions " section may be counterbalanced by a " superior " in the oral section. Two " considers " or one " weak " will entail failure.

155. *Order of subjects for first class examination.*—Examinations for first class certificates shall be conducted in the following order and stages :—

(*a*) to write answers within a prescribed time to ten questions in mathematics set with reference to clauses (*a*), (*c*), (*g*), (*i*), (*l*) and (*n*) of Rule 151 ;

(*b*) to write answers to questions set by the examiners appertaining to ten of the subjects specified in clauses (*b*), (*d*), (*e*), (*f*), (*g*), (*h*), (*j*), (*k*), (*m*), (*n*), (*q*), (*r*) and (*s*) of Rule 151, eight of which will be compulsory ;

(*c*) to make within a prescribed time a hand sketch or working drawing of a part of an engine or boiler or boiler mounting in accordance with clause (*o*) of Rule 151 ; and

(*d*) to answer orally questions appertaining to clauses (*b*), (*d*), (*e*), (*f*), (*g*), (*h*), (*j*), (*k*), (*m*), (*n*), (*o*), (*p*), (*q*), (*r*) and (*s*) of Rule 151.

156. *Assessment of work.*—The value of the work done in all four sections prescribed under clauses (*a*), (*b*), (*c*) and (*d*) of Rule 155, namely, mathematics, written questions, drawing and oral questions will be assessed in the manner prescribed in Rule 154 for second class candidates. In order to pass a candidate's work should be " good " in all four sections but it must be " good " or " superior " in the oral examinations. A " consider " in mathematics or drawing section may be counterbalanced by a " superior " in the other sections. Two " considers " or one " weak " will entail failure.

157. *Rules for examination room.*—Candidates for certificates of proficiency will be allowed in the time allotted to cancel any part of their work and, when required, additional paper will be supplied by the examiner, but they will not be allowed to work out the problems on a slate or on waste paper. The additional sheets shall be attached to and form part of the examination paper to be given in by the candidate.

Written answers and drawings shall be made out in the presence of the examiner and shall be given up, whether complete or not, on the expiration of the prescribed time.

The examination in rough working drawing for first class candidates may, at the candidate's option, be either a hand sketch clearly dimensioned and complete the necessary views and sections or a drawing to scale.

Drawing boards, T-squares and drawing paper will be provided at the examinations but candidates will have to bring their own drawing instruments.

If a candidate leaves the room before answering any question or before completing any paper which has been given to him he cannot afterwards be permitted to answer or complete the paper as the case may be but the examiner may substitute another question or another paper.

Any candidate discovered to have taken into the examination room any book, paper, document or memoranda of any description or to have copied from or afforded or given or received any assistance or any information to or from or communicating in any way with another candidate during the time of examination shall be regarded as having failed in his examination and shall not be allowed to proceed further with the examination.

158. *Time Table.*—Examinations for first and second class engineers shall be timed as follows unless otherwise notified by the Commissioner who shall also prescribe intervals if necessary—

Monday	...	Mathematics, 11 a.m. to 5 p.m.
Tuesday	...	Written answers, 11 a.m. to 4-30 p.m.
Wednesday	...	Drawing 11 a.m. to 4 p.m.
Wednesday	...	Oral examination (2nd class), 11 a.m. to 5 p.m.
Thursday	...	Oral examination, 11 a.m. to 5 p.m.

The examinations may be continued from day to day until all candidates have been dealt with :

Provided that if a candidate finishes his mathematical, written or drawing examination before the time prescribed for its completion the examiners may forthwith begin or continue as the case may be the oral examination of the candidate and proceed with it till 5 p.m. on that day and continue or complete it on any subsequent day of the examination.

159. *Grant of certificate of proficiency.*—If a candidate passes the examination he shall be granted a certificate in accordance with the class in which he passed at such early date within two weeks after the close of the examination as is practicable.

160. *Form of certificate of proficiency.*—Certificates of proficiency as engineers to be in charge of steam engines and boilers shall be in Form V of the appendix to the Rules.

161. *Duplicate certificates of proficiency.*—Duplicates of all certificates granted under these Rules shall be recorded in the office of the Commissioner.

Appendix to Part I of the Bombay Boiler Rules.

FORM A.

BOILER INSPECTION DEPARTMENT.

Register of Boilers.

(Rules 9, 18 and 22.)

1	2	3	4	5	6	7	8	9
Registry number.	Type of Boiler.	Boiler rating.	Name of manufacturer.	Year and place of construction.	Date of registration.	Name of owner.	Place where in use.	Remarks (Transfers, etc.)

In Part II of the Register, Column 1 should contain the registry number and letters.

FORM B.

INDIAN BOILERS ACT, 1923 (ACT V OF 1923).

Notice for Examination of Boiler under Sections 7 and 8.

(Rule 34.)

No. of 19 .

BOILER INSPECTION OFFICE,

Dated , the 19 .

To

In reply to your application dated you are hereby informed that Boiler Registry No. at the above named premises will be $\frac{\text{thoroughly examined}}{\text{hydraulically tested}}$ by the Government Inspector on the

To enable the examination to be made, you are bound—

(*a*) to afford to the Inspector all reasonable facilities for the examination and all such information as may reasonably be required of you ;

(*b*) to have the boiler properly prepared and ready for examination in the prescribed manner ; and

(*c*) in the case of an application for the registration of a boiler, to provide such drawings, specifications, certificates and other particulars as may be prescribed.

Voucher No. in acknowledgment of $\frac{\text{Bank}}{\text{Treasury}}$ Receipt No. for Rs. accompanies.

Inspector of Boilers.

(See reverse for preparation required.)

[*Reverse of Form B.*]

PREPARATION FOR EXAMINATION.

See Part II, Chapter I, of the Regulations.

(Regulation 150.)

(*A*) *Preparation for Inspection.*

At every examination of a boiler for the grant or renewal of a certificate, the boiler shall be empty and thoroughly clean in all its parts. All doors of manholes, handholes and sightholes and cleaning plugs and all caps in the headers and mud-drums of water tube boilers, all firebars, bearers, front plates, bridge plates, fire-bridges, brick arches, oil fuel burners and mechanical stoker fittings shall be removed. All valves and cocks comprising the boiler mountings shall be opened up and taken apart and the valves or cocks ground, when necessary, before the Inspector's visit.

Provision shall, if required by the Inspector, be made for the removal of lagging or brickwork or other concealing part and for the drilling of plates and for verifying the pressure gauge and safety valve dimensions and weights. All smoke tubes, exterior of water tubes, smoke-boxes, and external flues shall be swept clean.

Provision shall be made for the effective disconnection of all steam and hot water communication with any other boiler under steam, as prescribed in Part III of the Regulations. This shall be effected either by the removal of a length of pipe from the steam and feed piping or by the insertion of substantial blank flanges. Where blank flanges are employed, they shall be inserted between the flange of the chest and the pipe attached to it. No blank flange shall be inserted between a safety valve chest and the boiler.

(Regulation 152.)

(*B*) *Preparation for Hydraulic Test.*

The chest of all mountings subject to steam pressure shall be in place and shut tight or blank flanged. The safety valves shall either be jammed down or removed and the chest-opening blank flanged. The attachment* for the Inspector's pressure gauge and the nipple† for connecting the Inspector's test pump hose shall be in

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Note.—These provisions as to effective disconnection shall extend to every case wherein a person is sent or with the assent of the owner or person in charge goes into a boiler for any purpose. See Part III of the Regulations.

* Tapped $\frac{3}{4}$″ Whitworth bolt and nut thread.

† Tapped $\frac{1}{8}$″ Whitworth bolt and nut thread.

order. All doors shall be properly jointed and tightened up. The boiler shall be completely filled with water, care being taken to allow all air to escape and, if possible, a preliminary test not exceeding the working pressure of the boiler shall be taken before the Inspector's visit to test the tightness of the joints. When a boiler is hydraulically tested for the first time, it shall be entirely cleared of lagging or brickwork; at subsequent tests the lagging or brickwork, or portions thereof, shall be removed if required by the Inspector.

Preparation Now Required. (A), (B).

Note.—The last certificate for the boiler should be shown to the Inspector.

FORM C.

(*See* Rule 8.)

GENERAL WORKING OF BOILERS.

Instructions to Boiler Attendants.

These instructions should be frequently and carefully studied, with a view to keeping in mind the precautions to be observed, and the ordinary procedure to be followed in the safe working of boilers.

Precautions before starting the Fires.

Before starting the fires in a boiler, the attendant should—

(1) see that there is sufficient water in the boiler and that the gauge cocks are working freely;

(2) ease safety valves, or open cock on top of boiler to allow air to escape;

(3) see that the blow-off cock is fully closed and tight;

(4) see that the safety valves and feed check valve are free and workable;

(5) see that water is not leaking from any part of the boiler;

(6) note if the pressure gauge pointer is at zero;

(7) see that the feed pump is in working order.

He must not rely on the supposition that the water he has previously put in is still in the boiler, as it may have run out without his knowledge through a leak or open cock, nor can he be sure that the gauge glass shows the true water level until he has tested it. This is done in the following manner: shut off the lower gauge cock and empty the glass by the drain cock; then shut the drain cock and open the gauge cock; if everything is in order, the water will then rise in the glass to the same height as before.

Raising steam.—In getting up steam in all types of boilers the operation should be as gradual as circumstances will allow. Nothing turns a new boiler into an old one sooner than getting up steam too quickly. Forcing the fires when starting work is liable to cause straining of the seams and tubes of the boiler. In the case of large

boilers generally, steam should not be got up in less than six hours. Before getting up steam, the water level should be observed, to ensure that water is at the proper height in the glass, the pressure gauge noted, and the safety valves tried to see they are free. The blow-off cock should be examined to see that it is completely shut and tight.

Pressure gauge.—The pressure or steam gauge should be kept in order, and be in such a position as to be easily seen by the boiler attendant. There should be a plain mark on it showing the highest pressure allowed for the boiler, and the dial should be kept clean so that the figures may easily be read.

Steam pressure.—Ordinarily the safety valve will prevent the steam from rising much above the working pressure, but if the steam guage shows so rapid an increase of pressure as to indicate danger of exceeding the highest limit, water should be immediately fed into the boiler and the dampers partially closed in order to diminish the effect of the fire. If, however, the water has fallen so low that there is danger of an accident from this cause, the fires should be withdrawn before feeding in water, the safety valves eased, and if the engine is at rest it should be started so as to reduce the pressure.

The safety valves are provided to guard against over pressure. They should be moved by hand every day so as to prevent them from sticking. If moved only occasionally, they are liable to leak.

The valve can be tested by slowly raising it a little, and when let down, it should close perfectly tight. It should never be opened by a sudden knock or pull. If it does not close tight turn it on its seat until it fits, or when its construction does not permit this, raise it slowly a few times and let it down again, but on no account must the valve be screwed down further or loaded more than what has been allowed by the Inspector.

Safety valves must never be overloaded, and spring valves should have ferrules or other provision against the valves being screwed down too far. In case of an accident resulting from wilful overloading the culprit might be held criminally responsible at the official inquiry or inquest.

Low water safety valves.—If there is a low water safety valve, test it occasionally by lowering the water level to see that the valve begins to blow at the right point. It should give warning "before" the water level has sunk too low, and before damage can be done. When the boiler is opened, examine the floats and lever and see that they are free and that they give the valves the full rise. With the ordinary type of high-steam and low-water safety valve the float should be down at its lowest position and the valve full open when the boiler is empty.

The water gauges.—These will be kept in best order by frequently blowing through. The cocks are thus kept in good working condition without leaking. Blow through the drain cock at the bottom of the gauge, and shut and open the steam and water cocks every few hours. These cocks should be blown through more frequently when the water is dirty. Should either of the passages become choked, or whenever the water in the gauge glass moves sluggishly the passages must be cleaned. This is best done with a wire. The gauge glass is so arranged that its top cock connects with the steam space and its bottom cock is below the water line. The water line will ordinarily be near the middle of the glass tube. Always test the glass water gauges thoroughly the first thing in the morning and at the commencement of every shift. This is done by first opening the drain cock and then shutting

the upper cock which should give water : the upper cock should then be opened and the bottom cock closed which should give steam ; during this test the drain cock should be kept open.

If water and steam do not appear in proper order the cocks are choked and the passages should be cleaned. To lessen the risk of breaking the gauge glass the water cock should always be re-opened after the steam cock.

Gauge glasses with a narrow white stripe running the whole length of the glass on the side next the boiler are recommended as they show the water line more clearly, especially when the water is dirty.

The boiler regulations framed by the Board require every water gauge glass to be fitted with a guard to prevent injury to the attendants. See that it is always in place, and clean, when there is steam in the boiler.

Special Note.—It does not follow that there is plenty of water in the boiler because there is plenty of water in the gauge glass. The passages may be choked, and empty gauge glasses are sometimes mistaken for full ones, and explosions have resulted therefrom. Hence the importance of keeping the gauge cocks perfectly tight and clean and of blowing through the test cocks frequently.

A large number of accidents have been due to inoperative water gauges, and to negligence of the attendant in not carefully reading the water level.

The Blow-off Cock.—The Blow-off should be used daily if the water is at all dirty or sedimentary, especially with Locomotive type and Vertical Boilers, as their narrow water spaces are liable to get choked with mud, which soon hardens into a solid mass. The amount of water to be blown out depends on the size of the boiler and can be determined only from experience. When blowing out the best result is obtained, if the water has been at rest for some time (say before the engine is started) thus giving the sediment time to settle ; if the feed water is clean merely turn the cock round.

The Scum Cock.—When scum cocks are fitted, if the feed water is dirty, a little should be blown off daily ; if the water is clean, merely turn the cock round. Before opening the scum cock see that the water is at the height indicated by the water-level pointer, otherwise the scumming will be ineffective. Water should be blown from the surface through the scum cock when steam is being drawn off, i.e., when the engine or other machinery is working.

Manhole and other Door Joints.—When making such joints the jointing materials should never be of round-sectioned packing. Care must be taken that the spigot of the door is centrally placed in the hole, as many accidents have resulted from packing being blown out between the spigot and side of hole, even when the clearance was only $\frac{1}{8}$th of an inch. The nuts must be carefully and evenly tightened. Further tightening should be made during the process of heating up the boiler when raising steam.

Steam Pipes.—When properly arranged, should give no trouble. Frequently, however, they are so designed as to contain pockets, in which, while out of use, condensed steam accumulates. Such water is exceedingly dangerous and great care should be taken to see that the pipes are properly drained *before the stop-valve is opened* otherwise "water hammer" will take place even with the best designed steam pipes, and disastrous explosions, causing loss of life and property, may occur.

Scale and Grease.—Roughly speaking, scale offers a hundred times as much resistance to the passage of heat as does a similar thickness of steel or iron. A half inch furnace plate covered with 1/10th inch scale is as efficient a heat retarder as a steel furnace 10 inches thick. Grease is about ten times worse than scale. In a boiler at work the temperature of a clean furnace plate is only slightly in excess of that of the water in the boiler : but if scale or grease is interposed between the water and the plate, the latter acquires a temperature more nearly approximating that of the flame with which it is in contact. If the fire is fierce (artificial draught) the furnace tube may grow so hot that it elongates considerably. If in addition, cold air is admitted during each firing, a concertina action of the furnace takes place, which is one of the worst causes of boiler wear and tear.

Wear and Tear.—Can be reduced and the life of a boiler prolonged if scale and grease are prevented from accumulating in a boiler. The combined effect of scale or grease and artificial draught are disastrous. Scale or grease also causes waste of fuel.

Grease.—A mixture of sedimentary water, soda and grease produces an adhesive scum. Where this is suspected, the water level should never be lowered below the furnace top unless the boiler is afterwards entered and this scum cleaned off the furnace plate before firing again.

Scale Removal.—The customary method is not a satisfactory one. The boiler is emptied and then cooled down by opening all the manholes, and the result is that the scale, which would otherwise be soft, hardens through contact with the air, and requires laborious clipping off.

A very effective, but slower method, is to retain the water in the boiler until cool, and not to run it out until the men are ready to enter the boiler with water hose, brushes and scrapers. The scale will then be soft and easily removable.

If time is a consideration, the cooling can be accelerated by adding cold feed to the hot water in the boiler and slowly running off the cooled water. Another method is to blow off the boiler with the lowest possible pressure (not more than 20 lbs.) and to keep it closed until cold. The scale will then be easily removed.

Treatment of Feed water.—Many feed waters required soda or other chemicals to arrest corrosion or to change the nature of the scale.

There is *no harmless chemical* which will remove scale or sediment when it has once got into the boiler and the only effective process is to purify the feed water before it enters the boiler. By this means the sediment, and generally, too, the added chemicals, can be deposited in tanks or in filters, and therefore never goes into the boiler. Excepting when the water obtainable is very good, water-purifying apparatus ought to pay any boiler owner, particularly at those works where three or more boilers are in constant work. Boiler owners wishing to have definite advice as to the best treatment of their feed water should have it analysed at some Chemical Laboratory and ascertain the best treatment in the particular circumstances.

Special attention is drawn to the not infrequent but *very bad* practice of allowing the waste steam from the Engine Cylinders or Pumps to be drained into the boiler Feed Water Tanks. The waste steam from cylinders is always mixed with a certain amount of oily matter, which will be deposited in the feed water tanks and ultimately be pumped into the boiler, with possibly disastrous results, as it will be obvious to every careful boiler attendant that should the oil be deposited on the furnace crowns, they may become over-heated and collapse.

It should be the first care of the boiler owner, and the Boiler Attendant to see that the feed water is kept as pure as possible. Impure feed water means additional expense on the upkeep of the boiler.

Preservation of Boilers when not in use.—Steam boilers when not in use are liable to deterioration from corrosion, and, unless well cared for and made rust-proof they may depreciate more rapidly than when in use. They should be thoroughly drained and thoroughly dried and all valves, cocks and openings closed so as to exclude moisture. Another plan is to fill t' e boiler with water to which about 1/100 per cent. caustic soda has been added.

Special Instruction for Boiler No.

This boiler should be opened up and thoroughly cleaned after a period of work which should not exceed.....

A record of such cleanings should be maintained and produced when required by the Inspector.

Dated Inspector of Boilers.

Appendix to Parts II and III of the Bombay Boiler Rules, 1924.

FORM I.

(*See* Rules 96, 129 and 131.)

INDIAN BOILERS ACT, 1923 (ACT V OF 1923).

Application for an Engineer's Certificate of Proficiency or for a Boiler Attendant's Certificate of Competency or of Service.

Name, etc., of Applicant.

A

Name in full

Permanent address

Place of birth Date of birth

Particulars of all previous certificates (if any).

B

Number of certificate.	Proficiency, Competency or Service.	Grade.	Where issued.	Date of issue.	If at any time suspended or cancelled, state by what Court or Authority.	Date.	Cause.

Certificate now required.

C

Grade.	Proficiency, Competency or Service.	Address to which certificate may be sent.

Statement of previous failures (if any).

If applicant has failed in a previous examination for the certificate now required, he must here state the date and place of each examination in which he has failed. If he has not failed, he must state so in writing across this division.

D

Date of examination.	Place of examination.	Subjects in which he failed.

Declaration by Applicant.

(Take Notice)—Any person who makes, procures to be made, or assists in making, any false representation for the purpose of obtaining for himself or any other person a Certificate of Proficiency, Competency or Service, will be criminally prosecuted.

E I do hereby declare that the particulars contained in Divisions (A), (B), (C), (D) and (F) of this Form are correct and true to the best of my knowledge and belief; and that the papers enumerated in Division (F) and submitted with this Form are TRUE AND GENUINE documents, given and signed by the person whose names respectively appear on them; and further that those names are truly and correctly stated against each of the said papers as entered in Division (F); and further that the copies of the said papers, also submitted with this Form, are true and correct copies thereof. I further declare that the Statement (F) contains a true and correct account of the whole of my services without exception. And I make this Declaration conscientiously believing the same to be true.

Dated at , this of 19 .

Signed in the presence of :—

Signature of applicant.
Present address.

[*Reverse of Form I.*]

(F)—List of Testimonials and Statement of Service.

(Testimonials to be numbered consecutively as below)

Consecutive number of Testimonial.	Date of Testimonial.	Name of person signing each Testimonial.	Address and designation of factory or workshop where employed.	Number, type and heating surface of boilers.	Capacity in which employed.	Date of commencement.	Date of termination.	Time employed.			Initial of verifier.
								Years.	Months.	Days.	
1	2	3	4	5	6	7	8	9	10	11	12
1											
2											
3											
4											
							Total Service ..				
							Time served for which no certificates are now produced.				

Certificate of Examiners.

Examination. Certified that has been examined for a certificate of proficiency as engineer or a certificate of competency as Boiler Attendant of the class at this day of 19 , and has satisfied us of his fitness to hold a certificate of the FIRST, SECOND CLASS. He has therefore PASSED, FAILED.

Exchange. Certified that has produced before us at this day of 19 , a certificate of competency of the class as and we are of opinion that he should be granted a certificate of competency of the FIRST, SECOND CLASS in exchange.

Service. Certified that has produced before us at this day of 19 , satisfactory testimonials covering the required period of service and we are of opinion that he should be granted a certificate of service of the FIRST, SECOND CLASS.

Personal description of Applicant.

H { Nationality
Height ft. ins. Complexion
Colour of hair eyes
Personal marks or peculiarities.

Board of Examiners.

To

Commissioner.

Date

Office. Certificate No. of the class issued and duplicate recorded on 19 .

Commissioner.

FORM II.

Form of Certificate of Competency to be granted under Rule 120.

BOMBAY BOILER RULES, 1924.

Certificate No.

Photograph.

Certificate of Competency as First Class (or Second Class) Boiler Attendant.

To

Having satisfied us of your competency to fulfil the duties of Class Boiler Attendant in accordance with the Rules now in force we do hereby, in pursuance of the said Rules, namely, THE BOMBAY BOILER RULES, 1924, grant you this certificate of competency of the Class.

By order of the Governor of Bombay,

Board of Examiners.

This day of 19 .

[*Reverse of Form II.*]

CERTIFICATE No. 19 .

Signature of Owner
Date and Place of Birth
Address of Owner
Personal description ; Nationality
Height without shoes
Complexion
Colour of hair eyes
Marks or peculiarities

Thumb impression.

Certificate No. issued under my signature this day of 19 .
This certificate is given upon an Ordinary Examination passed at on the day of 19 .

Date of issue Commissioner.

N.B.—Any person other than the owner hereof becoming possessed of this certificate should transmit it forthwith to the office of issue.

FORM III.

Form of Certificate of Competency to be granted under Rule 120.

BOMBAY BOILER RULES, 1924.

Certificate No.

Photograph.

Certificate of Competency as First Class (or Second Class) Boiler Attendant.

MO-B Bk.H 715—75

To

Having produced before us a Certificate of Competency as Class issued to you by on we do hereby, in pursuance of the BOMBAY BOILER RULES, 1924, grant you this Certificate of Competency of the Class in exchange.

By order of the Governor of Bombay,

Board of Examiners.

This day of 19 .

[*Reverse of Form III.*]

CERTIFICATE No. 19 .

Signature of Owner

Date and Place of Birth

Address of Owner

Personal description ; Nationality

Height without shoes

Complexion

Colour of hair eyes

Marks or peculiarities

Thumb impression.

Certificate No. issued under my signature this day of 19 .

This certificate is given upon production of Certificate of Competency No. issued at after examination on the day of 19 .

Commissioner.

Date of issue.

N.B.—Any person other than the owner hereof becoming possessed of this certificate should transmit it forthwith to the office of issue.

FORM IV.

Form of Certificate of Service to be granted under Rule 120.

BOMBAY BOILER RULES, 1924.

Certificate No.

Photograph.

Certificate of Service as First Class (or Second Class) Boiler Attendant.

To

Having satisfied us that you have served for the period required in accordance with the Bombay Boiler Rules, 1924, prior to the coming into force of the Rules and being of opinion that you are possessed of competent practical skill, we hereby, in pursuance of the said Rules, grant you this Certificate of Service of the Class.

By order of the Governor of Bombay,

Board of Examiners.

This day of 19 .

[*Reverse of Form IV.*]

CERTIFICATE No. 19 .

Signature of Owner
Date and Place of Birth
Address of Owner
Personal description ; Nationality
Height without shoes
Complexion eyes
Colour of heir
Marks or peculiarities.

Thumb impression.

Certificate No. issued under my signature this day of 19 .

This certificate is given upon production of satisfactory testimonials of service in accordance with Rule 82 of the Bombay Boiler Rules, 1924.

Date of issue. Commissioner.

N.B.—Any person other than the owner hereof becoming possessed of this Certificate should transmit it forthwith to the office of issue.

FORM V.

Form of Certificate of Proficiency to be granted under Rule 160.

BOMBAY BOILER RULES, 1924.

Certificate of Proficiency of the First (or Second) Class.

To

Having satisfied us of your proficiency as an engineer to be in charge of steam engines and boilers, we do hereby, in pursuance of the BOMBAY BOILER RULES, 1924, grant you this Certificate of Proficiency of the FIRST (OR SECOND) CLASS.

By order of the Governor of Bombay,

Board of Examiners.

This day of 19

[*Reverse of Form V.*]

CERTIFICATE No. 19 .

Signature of Owner
Date and Place of Birth
Address of Owner
Personal description ; Nationality
Height without shoes.
Complexion
Colour of hair eyes
Marks or peculiarities

Certificate No. issued under my signature this day of 19 .

This certificate is given upon an Examination passed at on the day of 19 .

Date of issue. Commissioner.

N.B.—Any person other than the owner hereof becoming possessed of this Certificate should transmit it forthwith to the office of issue.

G. N., G. D., No. 5186, dated 13th July 1925 (B. G., Pt. I, p. 1914). **Rule 73.**

In exercise of the powers conferred by the proviso to rule 73 of the Bombay Boiler Rules, 1924, the Governor in Council is pleased to declare that the restrictions contained in the said rule shall not apply to boilers which do not exceed 100 "rating", and which are used for any of the purposes specified below :—

(*a*) Fire engines,

(*b*) Disinfectors,

(*c*) Motor vehicles for private purposes,

(*d*) Pumping water for the irrigation of farm lands, gardens and orchards,

(*e*) Tilling soil, sowing and reaping crops, and farm and dairy produce,

(*f*) Small industries in sugarcane crushing, extraction of oils, rice hulling and flour milling, and

(*g*) Private domestic heating, lighting and ventilation.

G. N., D. D., No. 1857/46, dated 20th September 1952 (B. G., Pt. IV-B, p. 1057). **Rule 73.**

In exercise of the powers conferred by the proviso to rule 73 of the Bombay Boiler Rules, 1924, the Government of Bombay is pleased to declare that the restrictions contained in the said rule shall not apply to an Electrode type boiler of any capacity and used for any purpose provided that the boiler is fitted with such automatic devices against over pressure or lowering of water below the working level as are certified by the Steam Boiler Department to be effective and satisfactory.